

We claim:

1. A method for controlling an engine of a powertrain in a vehicle on the road, the method comprising:

deactivating fuel injection to at least one engine cylinder
5 based at least on a vehicle operating condition;

determining a duration required for reactivating at least said at least one engine cylinder; and

reactivating at least said at least one engine cylinder based at least on said duration.

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2. The method of claim 1, wherein said operating parameter is whether the vehicle's powertrain is in an engine braking conditions.

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3. The method of claim 2, wherein said engine braking condition is determined based on whether the engine can be driven by the road through the powertrain.

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4. The method of claim 1, wherein said duration is an amount of time.

5. The method of claim 1, wherein said duration is a number of engine cycles.

6. The method of claim 1, wherein said duration is a number of engine events.

7. The method of claim 1, further comprising determining a minimum engine speed value based on an operating parameter, wherein said reactivating is further based on a comparison of said minimum engine speed with a predicted future engine speed based on said duration.

8. The method of claim 7, wherein said predicted future engine speed is predicted based on said duration.

9. The method of claim 1, wherein said vehicle operating condition is a requested engine torque.

10. The method of claim 1, wherein said vehicle operating condition is a vehicle speed.

11. The method of claim 1, wherein said vehicle operating condition is a rate of change of vehicle speed.

12. The method of claim 1, wherein all cylinders of the engine are disabled and reactivated together.

13. A method for controlling an engine of a powertrain in a vehicle on the road, the method comprising:

deactivating fuel injection to at least one engine cylinder based at least on a vehicle operating condition;

5 determining a duration required for reactivating at least said at least one engine cylinder;

determining a minimum engine speed value based on an operating parameter;

10 calculating an engine speed after said duration based on a rate of change of engine speed; and

reactivating at least said at least one engine cylinder based at least on a comparison of said calculated engine speed and said determined minimum engine speed.

15 14. The method of claim 13, wherein said operating parameter is whether the vehicle's powertrain is in an engine braking conditions.

20 15. The method of claim 14, wherein said engine braking condition is determined based on whether the engine can be driven by the road through the powertrain.

16. The method of claim 13, wherein said duration is an amount of time.

17. The method of claim 13, wherein said duration is a number of engine cycles.

5 18. The method of claim 13, wherein said duration is a number of engine events.

19. A computer storage medium having instructions encoded therein for controlling an engine of a powertrain in a vehicle
10 on the road, said medium comprising:

code for deactivating fuel injection to at least one engine cylinder based at least on a vehicle operating condition;

code for determining a duration required for reactivating at least said at least one engine cylinder;

15 code for determining a rate of change of engine speed; and

code for reactivating at least said at least one engine cylinder based at least on said rate of change of engine speed and said duration.

20. The medium of claim 19, wherein said code for reactivating further comprises code for reactivating at least said at least one engine cylinder based at least on a predicted future engine speed calculated based on said rate of change of engine speed and said duration with a minimum allowable engine speed.

21. A computer storage medium having instructions encoded therein for controlling an engine of a powertrain in a vehicle on the road, said medium comprising:

- code for deactivating fuel injection to at least one engine cylinder based at least on a vehicle operating condition;
- code for determining a rate of change of engine speed; and
- code for reactivating at least said at least one engine cylinder based at least on said rate of change of engine speed.